a What is claimed is

~~CLAIMS~~

1 A tractor including an electronic monitoring system, the system comprising:

(a) means for displaying and/or producing an output of information;

(b) means for sensing parameters of the tractor;

(c) locating means for establishing the position of the tractor, and

(d) means for combining one or more of the sensed parameters with positional information from the locating means to produce a map of one or more of the said parameters, or a parameter or parameters derived therefrom, as distributed across an area over which the tractor has travelled.

2 A tractor as claimed in Claim 1, wherein the said means for sensing parameters of the tractor include one or more sensors selected from the group comprising:

(a) an actual speed sensor for directly sensing the actual speed of the tractor over ground;

(b) a theoretical speed sensor for sensing from the tractor transmission the theoretical speed of the tractor if no wheel slip is occurring;

(c) an engine speed sensor for detecting the revolutions made by the engine of the tractor per unit time;

(d) a fuel flow sensor for detecting the fuel used by the tractor engine per unit time.

3 A tractor as claimed in Claim 1 or Claim 2, having one or more power take off shafts, the said means for sensing parameters of the tractor including a power take off speed sensor or sensors for sensing the revolutions per unit time made by the power take off shaft or shafts.

4 A tractor as claimed in any preceding claim having one or more implement linkages, the said means for sensing parameters of the tractor including one or more sensors selected from the group comprising:

(a) a linkage position sensor;
(b) a sensor for detecting whether the linkage is in a raised or lowered state;
(c) a draft force sensor or sensor on the linkage or linkages for sensing the draft force exerted on the tractor by any implement attached to the tractor.

5 A tractor as claimed in any preceding claim, the monitoring system including means for inputting, either manually or from a data carrier or by remote communication, data representative of one or more parameters selected from the following group, or a combination or combinations thereof:

(a) width of an implement attached to the tractor;
(b) cost of fuel;
(c) cost of tractor driver;
(d) depreciation cost of tractor;
(e) maintenance cost of tractor;
(f) tractor tyre cost;
(g) a parameter representative of soil type;
(h) crop value;
(i) crop yield;
(j) cost of a field treatment process;
(k) starting/stopping an operation of an implement attached to the tractor;

wherein the said combining means includes means for combining some or all of the said input data with one or more sensed tractor parameters and with positional information from the locating means to produce a map of a parameter derived from the said sensed parameter(s) and from input data selected from the said group as distributed across an area over which the tractor has travelled.

6 A tractor as claimed in any preceding claim, wherein the monitoring system includes means for receiving an electronic input representative of implement width directly from an implement attached t the tractor.

7 A tractor as claimed in Claim 2 and Claim 4, or any claim when dependent thereon, the parameter sensing means including the said linkage raised/lowered state sensor and the said actual speed and fuel flow sensors, the monitoring system further comprising means for noting the time and/or tractor location of a first lowering of the linkage, first raising of the linkage and a second lowering of the linkage, and means for calculating the fuel used between the said first raising and second lowering, and adding an equal portion of the said fuel used value, or a value derived therefrom, to each sample in a series of sampled sensed parameters sampled in the interval between the said first lowering and first raising.

8 A method of generating a map of estimated actual cost involved in applying a treatment or treatments to an area of agricultural land, as distributed over the said area of land, the method comprising:

(a) driving a tractor according to any of Claims 1 to 7, with an implement attached thereto for applying the said treatment, across the said area of land until the entire area is treated;

(b) prior to or during the said driving step, inputting into the said monitoring system data representative of one or more parameters selected from the following group, or a combination or combinations thereof:

(i) width of the said implement;
(ii) cost of fuel;
(iii) cost of tractor driver;
(iv) depreciation cost of tractor;
(v) maintenance cost of tractor;
(vi) tractor tyre cost;
(vii) a parameter representative of soil type;

(viii) data representative of the cost of a previous treatment or treatments of the said area of land;

(ix) the starting/stopping of an operation of an implement attached to the said tractor;

(c) during the said driving step, automatically generating the said map using sensed tractor parameter(s), input data selected from the said group and positional information from the said locating means

9 A method as claimed in Claim 8 further including the step of combining data representative of a unit crop value and data in the form of a map of yield from a previous harvest of the said crop from the said area of land with the said sensed parameter(s), the said input data and the said positional information to produce a map representing gross profit margin as distributed across the said area, the said further combining step being performed as the tractor is driven across the field.

10 A method as claimed in Claim 8 or Claim 9 wherein the said sensed tractor parameters include fuel flow rate, actual tractor speed and the lifting/lowering of the linkage, the further method comprising the steps of:-

(a) noting the time and/or tractor location at a first lowering of the linkage, first raising of the linkage and a second lowering of the linkage;

(b) calculating the fuel used between the said first raising and second lowering;

(c) adding the calculated fuel used value, or a value derived therefrom, to data gathered in the interval between the said first lowering and first raising of the linkage.

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